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PHILIP G. ALTBACH & TODD M. DAVIS

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TWAS AWARDS IN BASIC SCIENCES



Association of Indian Universities



SCHOOL OF DISTANCE EDUCATION ANDHRA UNIVERSITY, VISAKHAPATNAM-530 003

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Editor :
SUTINDER SINGH

Global Challenge and National Response

Notes for an International Dialogue on Higher Education

Philip G. Altbach*

Todd M. Davis**

Higher education has profoundly changed in the past two decades, and those involved in the academic enterprise have yet to grapple with the implications of these changes. Academic institutions and systems have faced pressures of increasing numbers of students and demographic changes, demands for accountability, reconsideration of the social and economic role of higher education, implications of the end of the Cold War, and the impact of new technologies, among others. While academic systems function in a national environment, the challenges play themselves out on a global scale. We can learn much from both national experiences and international trends. Ideas and solutions from one country or region may be relevant in another.

Since academic institutions worldwide stem from common historical roots and face common contemporary challenges, it is especially appropriate that international dialogue takes place. A comparative and global approach to thinking about higher education benefits everyone — the experience of one country may not be directly relevant to another, but issues and solutions touch many nations. This paper, and the discussions related to it, have several key aims:

- to highlight issues in higher education that face many countries and about which an international discussion can contribute insights;
- to contribute to the internationalization of higher education through discussion of international initiatives and linking of people and institutions committed to a global perspective and expanded international programs;
- to create a network of colleagues and centers working in the field of higher education worldwide in order to foster ongoing dialogue, communication, and possible collaborative research; and
- to link policymakers, key administrators, and the higher education research community in a creative dialogue on the central issues facing contemporary higher education.

We see this document, and the discussions that we hope it will stimulate, as a first step in an ongoing discussion. We are especially concerned to link "north" and "south" in a discussion that has been for so long dominated by the industrialized countries. We are convinced that there is much that can be learned by considering the experiences of countries and systems worldwide.

Background and Global Perspective

While it may not yet be possible to think of higher education as a global system, there is considerable convergence among the world's

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universities and higher education systems. The medieval European historical origin of most of the world's universities provides a common antecedent. The basic institutional model and structure of studies are similar worldwide. Academic institutions have frequently been international in orientation — with common curricular elements and, in the medieval period, a common language of instruction — Latin. At the end of the 20th century, English has assumed a role as the primary international language of science and scholarship, including the Internet. Now, with more than one million students studying outside their borders, with countless scholars working internationally, and with new technologies such as the Internet fostering instantaneous communications, the international roots and the contemporary realities of the university are central.

Higher education systems have also been moving from elite to mass to universal access, as Martin Trow pointed out in the 1960s. In North America, much of Europe, and a number of East Asian countries, academic systems approach universal access, with close to half the relevant age group attending some kind of postsecondary institutions and with access increasingly available for nontraditional (mainly older) students. In some countries, however, access remains limited. In China and India, for example, despite dramatic expansion, under 5 per cent of the age group attends postsecondary institutions. In some countries with relatively low per capita income, such as the Philippines, access is high, while in some wealthier nations, it remains a key point of challenge. Throughout Africa, access is limited to a tiny sector of the population. Access is an increasingly important issue everywhere, as populations demand it and as developing economies require skilled personnel.

Demand for access come into conflict with another of the flashpoints of controversy of the present era — funding. Higher education is an expensive undertaking, and there is much debate concerning how to fund expanding academic systems. Current approaches to higher education funding emphasize the need for "users" to pay for the cost of instruction, as policymakers view higher education increasingly as something that benefits the individual, rather than as a "public good" where the benefits accrue to society. This new thinking, combined with constrictions on public expenditures in many countries, have meant severe financial problems for academe. These difficulties come at a time when higher education systems are trying to provide expanded access. Higher education's problems have been exacerbated

in many of the poorer parts of the world by the idea, popular in the past several decades and stressed by the World Bank and other agencies, that basic education was most cost-effective — as a result, higher education was ignored by major lending and donor agencies.

Academic systems and institutions have tried to deal with these financial constraints in several ways. Loan programs, the privatization of some public institutions, and higher tuition are among the alternatives to direct government expenditure. In many parts of the world, including most of the major industrialized nations, conditions of study have deteriorated in response to financial constraints. Enrolments have risen but resources, including faculty, have not kept up with needs. Academic infrastructures, including libraries and laboratories, have been starved of funds. Less is spent on basic research. Conditions of study have deteriorated in many of the world's best developed academic systems, including Germany and France. There has also been a dramatic decline in academic conditions in sub-Saharan Africa and in some other developing areas. Students have taken to the streets in large numbers to protest declining budgets and poor conditions for the first time since the 1960s.

While these trends, and the circumstances discussed below, vary to some extent from country to country, there is considerable convergence. Academic leaders worldwide worry about the same set of topics. Specific circumstances vary from one country to another, and there are certainly major differences between the Netherlands and Mali. Yet, solutions from one country may be relevant, at least in terms of suggesting alternatives, elsewhere. For example, there is much interest in Australian ideas concerning "graduate tax" repayment schemes based on post-graduate income. The United States, as the world's largest and in many respects leading academic system, experienced the challenges of universal access first, and American patterns of academic organization are of considerable interest elsewhere.

We live in a period of rapid change in higher education, a period when we can learn much from the experience of others. In short, higher education has gone global but with a variety of accents. These global concerns or issues are actually not discreet topic areas. They are better understood as issue clusters. Each of the following are actually related concerns that are increasingly difficult to isolate and manage in a reductionistic manner. On the short list of issue clusters are the following:

The Issue Clusters

We identify several themes that seem to us to be central to current developments in higher education worldwide. These themes deserve elaboration and analysis. They affect countries and regions differently, although we believe that all are relevant internationally, and that a discussion of implications can lead to understanding that will be useful for both comparative and national analysis.

- Education and work are activities that should feed one another. The links and transition points from initial education to the work force are weakly articulated. This is true in the developed world as well as in the developing world. Educators and business leaders rarely discuss, let alone agree upon a set of skills and orientations that are prerequisites for successful employment. The formal structures by which education systems prepare students for tomorrow are similarly weakly developed. Models developed in Germany, through the linking of postsecondary education and apprenticeship arrangements, or the community college system in the United States are currently being explored in several areas. Professional education often links well to employment in many countries, but education in the arts and sciences is less well articulated. It is not clear how close the articulation can be, but the issues are worthy of further consideration.
- While the initial transition from school to work may be poorly articulated the demand for education throughout the life cycle is becoming apparent. Fed by rapid changes in technology and the creation of employment categories that did not exist ten years ago, workers and employers must continually attend to the educational dimension. As the nature of work has evolved, so have the needs of those in the workforce to continually upgrade their capacities. This has led to the development of a variety of educational forms beyond the bachelors degree. In Germany, recent changes in their degree structure have led to the modularization of graduate degrees. In the United States, certificate programs and short term courses of study are being rapidly developed. By one recent estimate corporations in the United State alone will spend \$15 billion over current expenditures by 2005 just to maintain current employee training levels. Others estimate that world wide expenditures on training amount to many billions of dollars annually to insure that their work force has the skills necessary to compete in an ever competitive and high
- velocity business environment. In many countries, especially in the developing world, graduate education is coming into its own as the need for advanced skills and for continuing education is increasingly clear.
- It has become a point of banality to remark on the changes that technological developments have wrought. Indeed, many of the dislocations in school to work transition and the press for lifelong education are partially the result of these developments. More directly, however, technology has made possible a revolution in distance education which has important implications for the accreditation of educational institutions and assurance of quality in such circumstances. Technology is also beginning to have an impact on teaching and learning in traditional universities. It is also a truism that this technology is expensive, subject to rapid obsolescence, and that it requires high initial investment simply to get into the game. For many developing countries, cost is at present prohibitive, and it is precisely these areas where technology can provide the greatest short-term improvement. Technology is also central to the communication, storage, and retrieval of knowledge. The traditional library is being revolutionized by web-based information systems, as are the management systems of many universities. Technology is the least understood of the issue clusters discussed here, and perhaps the one with the greatest potential for transforming higher education.
- We have noted in passing the increase in the number of internationally mobile students. While this is an exciting and important trend, it is not without some important consequences. As the market for individuals with trans-national competencies has grown so have opportunities for individuals with marketable skills in other countries. Currently the transfer of talent has been from developing countries such as India and China to the developed world. In the United States, the stay rates for advanced students in the engineering disciplines and the sciences can be higher than 75% for students from particular countries. These students from the perspective of national education authorities may represent a considerable hemorrhaging of talent and talent that has been developed by the students' country of origin. If nations are to develop a means must be found by which talent can flourish in the soils that originally nurtured it. Related issues of internationalizing the curriculum and

providing a global consciousness to students, including instruction in foreign language, and ensuring that the academic profession is linked internationally are central to any discussion of the internationalization of higher education.

- Although seldom discussed, one of the areas of greatest expansion worldwide has been graduate education — the post baccalaureate training for the professions as well as for science, technology, and teaching. Graduate education offers great opportunities for international links and cooperation. Countries can take advantage of graduate training capacities elsewhere, and the new technologies can provide key links. Highly specialized and advanced level teaching and research deserves careful analysis.
- The privatization of higher education is a worldwide phenomenon of considerable importance. In Latin America and some parts of Asia the fastest growing parts of the academic system are private institutions. In central and Eastern Europe, private initiative is also of considerable importance. Public universities are in some places being "privatized" in the sense that they are increasingly responsible for raising their own funds. They are asked to relate more directly to society. Students are increasingly seen as "customers". The expansion of the private sector brings up issues of quality control and accreditation since in many parts of the world there are few controls as yet on private sector expansion. Access is also a central issue. As some developing areas, such as sub-Saharan Africa, will soon be experiencing the growth of private institutions, understanding in a comparative context the problems and possibilities of private higher education is an urgent need.
- The academic profession is in crisis almost everywhere. There is a rapid growth of part-time faculty members in many countries, and traditional tenure systems are under attack. The professoriate is being asked to do more with less, and student-teacher ratios, academic salaries, and morale have all deteriorated. The professoriate is being asked to adjust to new circumstances but is given few resources to assist in the transition. Without a committed academic profession, the university cannot be an effective institution.
- Access and equity remain central factors, but in the current policy context are sometimes ignored. While academic systems worldwide have ex-

panded dramatically, there are problems of access and equity in many parts of the world. Gender, ethnicity, and social class remain serious issues. In many developing countries, higher education remains mainly an urban phenomenon, and one that is reserved largely to wealthier segments of society. Although women have made significant advances, access for women remains a serious problem in many parts of the world.

- Accountability is a contemporary watchword in higher education. Demands by funding sources, mainly government, to measure academic productivity, control funding allocation etc is increasingly a central part of the debate on higher education. Governance systems are being strained, sometimes to the breaking point. To meet the demands for accountability, universities are becoming "managerialized", with professional administrators gaining increasing control. The traditional power of the professoriate is being weakened.

These are some of the key topics that affect contemporary postsecondary education worldwide. While this is by no means a complete list, it provides the basis for discussion and cooperation. International and comparative analysis can help to yield insights on how to deal with these topics in individual countries.

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Case Study — An Integrated Methodology

S. Sivaramakrishnan*

Case study is a method of exploring and analysing the life of a social unit — be that a person, a family, an institution, a cultural group or even an entire community.

Case study is a complete analysis and report of the status of an individual subject with respect, as a rule, to specific phases of his total personality.

Descriptive Case Study

The case study is a form of descriptive research. Although it consists of a vigorous, detailed examination of a single case, the underlying assumption is that this case is an example of many other such cases. Consequently by in-depth study of a single case, a greater understanding about other similar cases is achieved. This is not to say, however, that the purpose of case studies is to make generalisations — drawing general conclusions from a case study is not justifiable. On the other hand, the findings of a number of case studies may play a part in the inductive reasoning that is involved in the development of hypothesis.

Historical Case Study

The case study is concerned with everything that is significant in the history or development of the case. The purpose is to understand the life cycle, or an important part of the life cycle of an individual unit. This unit may be a person, a family, a group, a social institution or an entire community. The case method probes deeply and intensively analyses interaction between factors that produce change or growth. It emphasises longitudinal or genetic approach, showing development over a period of time.

The case study involves the collection and analysis of many sources of information. In some respects, the case study has some of the same features as historical research. Although it consists of intensive

study of a single unit, it may be that the ultimate worth is an insight and knowledge of a general nature and improved practices.

When we can pluck an example from the past and use it to help us today that is very practical use of history. A case, historically scientific document, of any institution or individual becomes inevitable.

Historical research is an accurate record of how, when and where the event started; how it progressed and when it ceased. The historian explains the event by describing the condition which led unto it and out of which it grew.

Integrated Methodology

The case study is very flexible as to the amount and type of data that are gathered as well as the procedures used in gathering the data. Hence the steps in the methodology are not distinct or uniform with all case studies.

To gather valid and reliable information for a case study, an integrated approach in methodology is adopted. The investigator conducts personal interviews, searchs through literary source materials and adopts questionnaire method.

Interview Technique

The interview gathers data from individuals in face to face contacts. It has the obvious advantage of ensuring greatest return.

The interviewer prepares an interview questionnaire clearly outlining the best sequence of questions and stimulating comments which would systematically bring out the desired responses. A written schedule prepared for the study provides a set plan for the interview, precluding the possibility that would fail to get important and needed data. Prior to the day of scheduled interview, the investigator visits the respondents on several occasions to enhance rapport with the interviewees.

Interviews may be conducted with the case under study and his/her friends, relatives, coaches,

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administrators, etc and the secondary source of information may be correlated with the recorded information from the case himself/herself and reliability established.

Literary Source Method

The investigator searches through the primary and secondary sources and documents the available information. While documenting information from books, journals, magazines etc. as used in historical research method, internal and external criticisms are applied to establish validity and reliability of the data.

Questionnaire Method

In a case study survey, a standard questionnaire to record the psychological traits of the case under study is used. They may be questionnaire tools for studying 16PF, sports achievement motivation, anxiety, self concept etc.

Opinion questionnaires are constructed to col-

lect information on the case under study, from his/her friends, relatives, coaches, administrators, umpires, spectators and others.

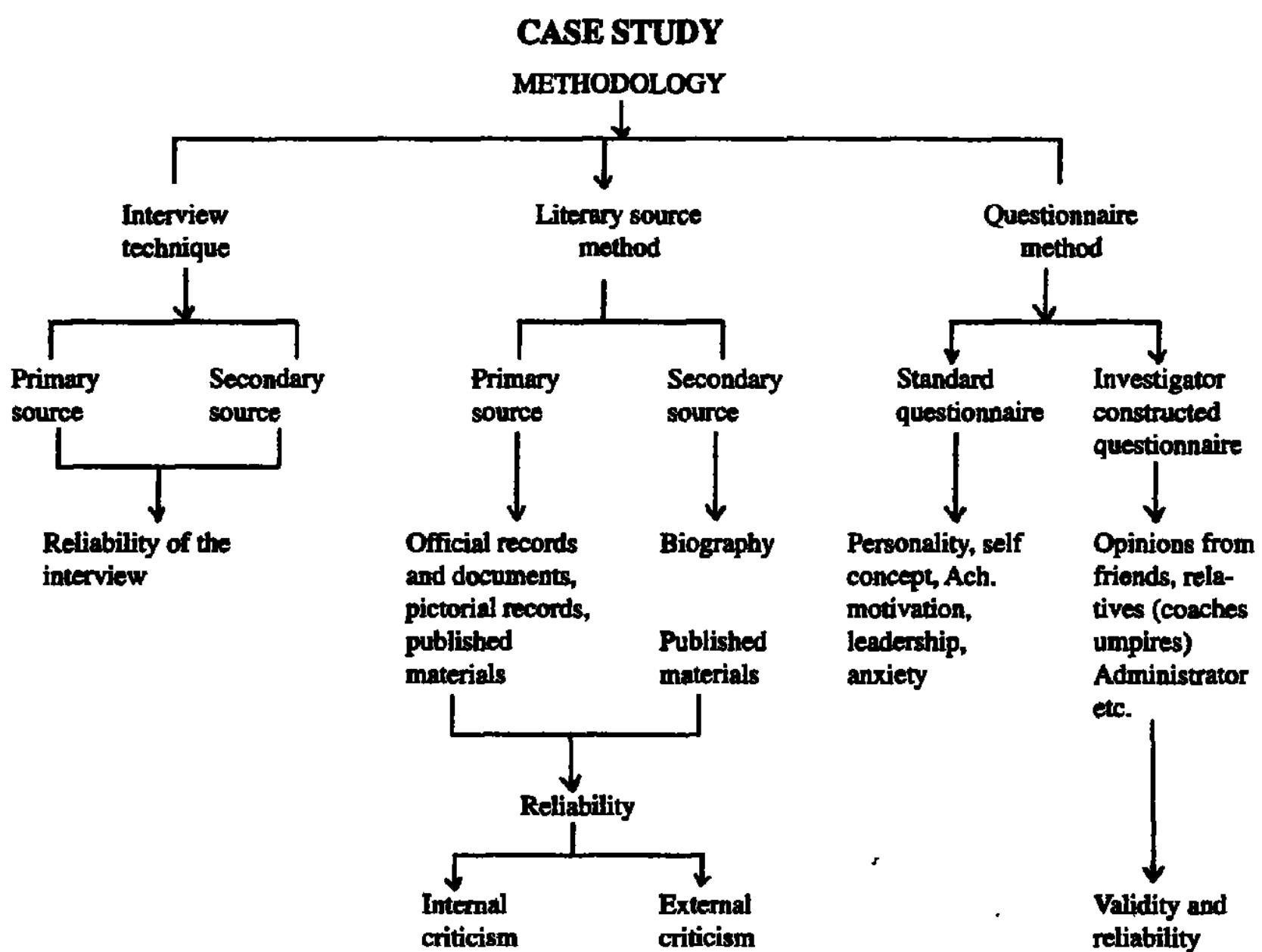
The questionnaires constructed by the investigator are standardised by internal consistency statistical technique, before application.

Conclusion

Case histories of outstanding persons are lacking.

The life, educational and professional career and contributions of elite persons/athletes must be scientifically documented and presented to the world.

The absence of such endeavours has deprived the active community and budding youth of an opportunity to understand and appreciate the various facets of the career of their predecessors and draw lessons from them.



Research Methods in Library and Information Science

Rajesh Singh*

We live in a world of fantastic scientific achievements ranging from those which contribute to the maximum welfare and pleasure of man to those which are capable of his complete annihilation. We have conquered time and distance, the sea and the sky; our atomic submarines can stay an unlimited time and cover an unlimited distance under water; our aircrafts can travel faster than sound. We have placed satellite and astronauts in orbit. We have sent 'Path Finder' to the Mars to find out whether appropriate conditions for human habitation exist or not. We, also, have bombs and missiles capable of almost instantaneous destruction of whole cities. The progress which has been made in our society has been largely the result of research. Still, most of us have a vague idea of what research is exactly.

Actually research is simply the process of arriving at dependable solutions to problems through planned and systematic collection, analysis and interpretation of data. Research is the most important tool for advancing knowledge, for promoting progress, and for enabling man to relate more effectively to his environment, to accomplish his purpose, and to resolve his conflicts. It is "the use of appropriate methods in attempting to discover new knowledge or to develop new applications of existing knowledge or to explore relationships between ideas or events".¹ Thus research is an investigation directed to the discovery of some fact on careful study of a subject. It is a course of critical or scientific enquiry. It is oriented towards the discovery of the relationships that exist among the phenomena of the world in which we live.

Research has become the most remarkable modern phenomena of development. Scientific discoveries, technological achievements and scholarly publications are all the fruits of research. All the spheres of modern life are considerably affected by researches. It has also been an inevitable process for the scientific development of all disciplines. Library and information science, which has developed as an independent and a vital

discipline in the present century, also needs verification, improvement and constant development through research by men of letters in the field.

Abundant literature is available to "stimulate practicing librarians, to undertake research by helping them to identify research topics, devise workable methodologies, recognise the standards by which research is judged".² But hardly has any attempt been made to appraise and explain scientific research methods in the field of library and information science. Scientific method of research, may be said to, consist of systematic and purposeful collection, classification and interpretation of data. Now let us consider first about research setting and design.

To assume efficiency in research, it is essential to design research programme and to prescribe certain steps and norms which make the study of problems methodological.

Research Setting and Design

The research setting and design is a conceptual system within which research is conducted. It constitutes the blueprint for the collection, measurement and analysis of the data. As such it includes an outline of what the researcher will do from writing the hypothesis to its operational implication in the final analysis of data. Prior to research following decisions are to be taken :

- (a) What is the study about? (Identification of problem).
- (b) What kind of method to be employed by means of which the identified problem will be studied? (Methodology).
- (c) Why is the study being made? (Purpose of study).
- (d) What type of data is required?
- (e) From where can required data be collected?
- (f) What period of time will the study require?
- (g) What will be sample design?
- (h) What Technique of data collection to be used?

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- (i) How to employ a particular method to carry out research successfully?
- (j) In what style will the report be prepared?

Research setting and design is needed to facilitate the smooth setting of various research operations, to make the research as efficient as possible, yielding maximum information with minimal expenditure of efforts, time and money.

The research methods applicable in library and information science have been classified as under³:

Research Methods in Library and Information Science

Historical Method	Survey Method	Case Study Method	Delphi Method	Statistical Method
Observation Technique	Questionnaire Technique	Interview Technique	Documentary Technique	

Historical Method

According to the Shorter Oxford English Dictionary,⁴ history is "a written narrative constituting a continuous methodical record, in order of time, of importance or public events, especially those connected with a particular country, people, individual etc. "History is essential, if we are to understand our present environment, then we should know how it grew up. History is the story of its development; of its evolution and of its origin, and it helps to explain the present in this way.

History of library and information science is the continuous methodical recounting of past events pertaining to the establishment, maintenance and utilization of systematically arranged collection of recorded information. It narrates, in order of time, the various developments, their causes and effects on the profession of librarianship.

Goldhor⁵ considers historical research "a battery of devices by which one is added to reach a conclusion as to the probable truth of events in past, as reflected in the objects available for study in the present". Thus historical research method is a past oriented research which seeks to illuminate a question of current interest by an intensive search of materials, that already exist. It also seeks to discover materials whose existence had not previously been known to recent generation. The discoveries made by various scientists by re-interpretation of events in the light of the increasing amount of information available, is also historical research. Thus truth is that

a proper study of past will provide key to the present. The present day systems and its varying forms and rules could be easily explained by the study of the history. Although the present is all together different from what the past was, but still the origin of the present lies in the past.

Historical method, like in several other disciplines, if adopted in Library and Information Science research, will be foundation for improvement on the basis of the past study. It can also help to find out various shortcomings in the field on the basis of past. It "can contribute to the body knowledge about librarianship and it can also facilitate our understanding of when, how and why past events to librarians as collectors organisers, and disseminators of the products of humanity's intellects and emotions"⁶. It also often recognises the social economic, political, intellectual and cultural environment in which these events occurred. This method can be used to study (a) Historical developments of libraries and library materials, (b) Impact of printing on libraries, (c) Development of library profession, (d) Development of education for librarianship, (e) History of library systems and services, (f) Role of library associations, (g) History of library movement, and (h) Emergence of multidimensional subjects and their impact on library profession.

Survey Method

A survey is "a systematic collection of data concerning a system, its activities, operations, persons involved in that system, also persons who are benefiting from that system."⁷ The main "purpose of the survey is to collect, organise and disseminate information useful to the scholars, and all the surveys attempt to further the improvement of services, which almost inevitably calls for providing evidence that the deficiencies exist."⁸

The library survey may be defined as a systematic collection of data concerning a library, its activities, operations, personnel working in the library and its users. The purpose of library survey is to make a specialised type of investigation to improve library services. Library surveys are conducted either to assess an existing situation or to check library system or to evaluate the area of librarianship in order to remove shortcomings or inadequacies and to plan further.

The vital aspect of survey method is collection of data. Following techniques are mainly employed for data collection in survey method of research :

Survey Method

Observation Technique	Questionnaire Technique	Interview Technique	Documentary Technique
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Observation Technique

Observation is at once the most primitive and the most refined of modern research techniques. It is, undoubtedly, the first procedure of science. It underlies all research; it plays particularly a prominent part in the survey procedures. P.V. Young⁹ defines observation as "systematic viewing, coupled with consideration of the seen phenomena, in which main consideration must be given to the larger unit of activity, by which the specific observed phenomena occurred". Observation is a perfect method of serial investigation. For field data the observation technique is also called classical technique. It is a process of gathering information by means of direct sensory perception. A relationship is established between researcher and respondent, in this technique. It enables a direct contact between subject and object involving intellectual processing of the subject or any part of it with a definite purpose. This technique can be used to study (a) users needs, (b) user behaviours, (c) users reading habit, (d) use of library material, (e) evaluation of library services, (f) functioning of different sub-systems of a library system, and (g) users approach to information.

The observation may be 'Participant' or 'non-participant'. When the researcher participates in the activities of the group under study, it is known as participant observation. But when the researcher abstains from the activities of the group, and simply observes them from a distance, it is known as non-participant observation. Purely non-participant observation is extremely difficult. Again the observation may be 'controlled' or 'uncontrolled'. When the observation is made in the natural setting, and the group activities are carried out in their usual course, without being influenced or guided by any external force it is known as uncontrolled observation. In controlled observation group activities are guided and phenomena is put to laboratory type test, under guided conditions.

Questionnaire Technique

In fact I should have used the term 'mailed questionnaire' since the instructions denote that the term questionnaire is used as a guide in interviewing. Questionnaire is "a formal list of questions, especially as used in an official enquiry".¹⁰ In this technique, to collect data essential for conducting research, a set

of questions are asked from the participants. Questionnaire is constructed translating the aims and objectives of the survey study. This is a major instrument for data gathering in survey studies. The literature survey reveals that most of the research is conducted by this technique only. "The advantage of questionnaire method lies in its more complete coverage of users' interests and analysis of their replies, which appear to be relatively simple procedure."¹¹

This technique is most feasible and economical for gathering data when the coverage of study is geographically very large and where researcher could not collect it personally. This technique can be helpful for research studies like (a) users needs, (b) evaluation of library services, (c) users survey, (d) nature and extent of library resources, (e) employment prospects, salaries, job satisfaction of library staff, (f) functioning of library system, (g) study of library automation, and (h) study of cooperation among libraries etc.

The main advantage of a questionnaire technique is low cost for a large coverage. It is suitable for repetitive information with greater validity.

Interview Technique

A research technique very similar in nature and purpose to the questionnaire is the interview. In fact, except for certain relative advantages which need to be clearly recognised the two techniques are, for some purposes atleast, essentially interchangeable.

Interview technique is a direct method of data collection. It is a conversation carried out with the definite purpose of obtaining certain information by means of the spoken words. It may be regarded as "a systematic method by which a person enters more or less imaginatively into the life of a comparative stranger".¹² Thus its importance arises from the necessity to come into contact with individuals to get access to facts and opinions.

This technique is suitable for the following areas of research (a) user satisfaction survey, (b) users needs, (c) library staff job satisfaction, (d) employment prospects, status in librarianship, (e) library co-operation, (f) library resource-sharing, (g) Inter-library loans, (h) manpower planning, (i) union catalogue, and (j) library administration etc.

The interview can be either 'structured' or 'unstructured'. In structured interview complete schedule is used. The interviewer has to abide by the questions of schedule. Whereas in unstructured interview no direct or predetermined questions are

used. The field worker may be told certain broad topics upon which the information is to be collected.

Documentary Technique

Besides observation, questionnaire and interview, there is another source of data which may be termed as documentary source. It has been an important source of information. Through documentary technique the researcher makes use of any or many documents or record, published or unpublished to extract necessary information. Document is a very important, dependable and valuable source of information which is a record that contains important information about a problem or aspect of study. Document may be a life history, diaries, letters, official and unofficial records, proceedings of parliaments, committees, courts, societies etc, business and legal papers, any act or constitution, official statistics, report of surveys, pamphlets etc. This technique can particularly be used for data collection in following areas of research (a) Bibliometric studies, (b) Historical studies, (c) Indexing and abstracting, (d) Biographies, (e) Thesauri construction etc.

Literature available on the topic and observation reveal that none of the above four survey techniques of data collection—observation, questionnaire, interview, and documentary—is complete in itself. For greater validity of research results, these technique should be used in combination.

Case Study Method

Case study is "a technique in which an individual or group, institution or phenomenon is recognised as a unit of study and various aspects of the unit are studied deeply".¹³ Unit of study may be an individual, a family, an institution, a culture group or an entire community. It may also be an abstract thing like a set of relationships or processes viz. administrative crisis in libraries, system adjustment, library cooperation etc. It aims at deep and detailed study of the unit, though the field of study is comparatively limited. It aims at studying everything about something, rather than something about everything as in the case of statistical methods.

In essence the case study resembles almost all other types of research. It borders on historical research, for instance, in the sense that the present case can be understood only in view of its past. It is closely related to documentary research in that it deals with living individuals in their present set up. Case studies resemble survey studies in that they are concerned with the present status of phenomena.

They differ from survey studies, however, in that the determination of status is only a secondary aspect in the situation; the more fundamental question is discovering how it got that way.

In case study method emphasis is on principles and processes rather than the transfer of factual information. It presents real solutions drawn from practice and provides an opportunity to enquire skills in analysing problems, making decisions and solving them. It helps in developing technical skills essential for librarianship. This method can be used in (a) library administration/management, (b) system analysis studies, (c) cost benefit analysis studies, (d) cost effectiveness analysis studies, (e) library effectiveness analysis studies, and (f) computer application in libraries.

Delphi Method

Delphi method is basically a technique of obtaining consensus among experts opinion on a given problem. A questionnaire is prepared translating the aims and objectives of research. The identified problem is put up to the panel of experts in many rounds till a consensus agreement is achieved. According to Halmer "Delphi method is a technique for obtaining opinions from a panel of experts in a particular field, through a questionnaire and these questionnaires are submitted several times until a judgemental data is obtained."¹⁴ The basic theory behind this method is that consensus opinion among majority of opinions will have greater credibility and authority than the surmise of only the most articulate/spokes-persons in a group of participating respondents. "The Delphi study is performed by sending a systematically formulated questionnaire to a panel of experts in a number of rounds."¹⁵

The Delphi study is performed in following rounds :

First Round : An open ended questionnaire is prepared and sent to the selected experts in panel.

Second Round : The panel members are asked to rank order preliminary priorities among the responses. *

Third Round : The panel members are now asked to vote on the ranks of the items and asked to provide a statement of the reason.

Fourth Round : Final answers are requested on all the arguments and counter arguments that were presented.

The medians of the responses of this final round are accepted as the group's opinion, representing the nearest thing to a consensus of the problem. The following areas of research can be studied through this method (a) Formulation of library legislation, (b) Library policies making, (c) curriculum design for librarianship, (d) Methods of teaching and evaluation, (e) Decision making process, and (f) Manpower planning and requirements.

Statistical Method

Statistics is the science which deals with the collection, classification and tabulation of numerical facts as the basis for explanation, description and comparison of phenomena. And "Statistical method is basically a technique of handling quantitative information in such a way as to make that information meaningful. Statistical method is concerned with numerical relations of those aspects of things which repeat themselves indefinitely."¹⁶

Statistical methods are being used for aggregative analysis and intensive study of individual unit is outside its scope. Statistical inferences are based upon averages and they are applicable upon the population as a whole and not on any particular as unit. This method is based upon quantitative analysis. Only the phenomena which is capable of being expressed numerically can be studied numerically. Thus in the process of conducting research researchers have to compile and collect different types of numerical data. Unless techniques of quantitative analysis are used, the data, too, will not be useful.

By using statistical methodology, the researcher can test hypothesis, compute means and other measures of central tendency; assess the relationship between one variable and another; make predictions; determine the reliability and validity of instruments and measurements; and generalise conclusions from sample data.

This method can specifically be used to study the following problems: (a) Budget estimates of library, (b) Library planning studies, (c) Assessment of library services, (d) Evaluation of library services, and (e) Library forecasting studies etc.

Conclusion

Library and information science, as an independent discipline, is of recent origin. There is an acute need of scholarly researches on every branch of this subject for its proper growth and development. The disparities and deficiencies prevailing in the subject field are also in need of scholarly reflections

through researches. Each of the methods mentioned above is not complete in itself. Literature surveys, observations and personal experiences while conducting researches have revealed that application of more than one method in research is essential to carry out proper research and to get scientific solution to the problems under study. Though it is not possible to delineate a particular research method to study certain problems, only an attempt has been made to show which method is most suitable to a certain problem.

It also does not mean that the most suitable method of research only can provide a scientific solution to the problem. Instead a researcher should employ as many research methods as possible for the purpose of getting scientific solution to his problem.

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Improving Professional Determinants

Teacher as Researcher

Santosh Behera*

A physician may fail to control and convince the patients standing in a queue in the health camp. A politician may fail to win the hearts of the citizens to come out victorious in an election. A food-processer may fail to satisfy its consumers. A photographer may not bring all the things that he wants to keep in his camera. So also a teacher. He may either not communicate well his ideas to his students, or may not study the individual differences among the students to modulate his process of instruction, or may fail in developing adequate and appropriate curriculum for desired objective and so on. Solution to such problems relating to one's profession does not merely require others' suggestions but the practitioner himself should know the situation in order to improve the rationality and ethics of his practice, his understanding of the practice and the environment in which practice is carried out. The way to understanding the practice and the determinants of the practice is not an involuntary activity, but a systematic and scientific way of investigation which is called research. However, when such research is conducted by the practitioner himself and the products of the research are in improving the practice and study the effectiveness of those products, it is known as Action Research. So to improve the professional environment, instead of basic or fundamental research, where the purpose is to develop mere theories and principles, action research is to be carried out whose purpose is to solve the immediate and practical problems relating to one's own practice. The very word practice is to be understood not as a mere behaviour, but as informed and committed action. Hence for the development of institution-based curriculum, objective-based instruction, institution improvement programme, professional policy and all other determinants of professional environment, the teacher is an action researcher. Since it includes both action and research, a series of questions come to the mind of the teacher. How such research is to be conducted? Does it have some specific methods and techniques other than fundamental research? Whether it is action or research or both? Can the findings of action research be generalized?

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Action Research

Action research is not distinguished from other forms of research by the use of a specific set of research technique. It follows the same technique of stating the objectives, formulating hypothesis, collecting data, analysing data and testing hypothesis. So with regards to such techniques, action research is not particularly distinctive. What distinguishes action research is its method rather than particular technique. It is based on a self-reflective spiral cycle of planning, acting, observing and reflecting.

Planning usually starts with something like a general idea. It involves identifying the problem, analyzing the problem by collecting relevant facts and formulating the strategic action plan with a view to solve problems. The next step is devoted to execute the overall plan which is acting. It refers to implementation of the planned strategic actions. The purpose of the next step (observing) is fact-finding where the researcher uses different types of evaluation methods & techniques to evaluate whether the actions have brought about any change and the objectives stated for the action have been attained or not. Reflection refers to reflecting the results of evaluation as well as the whole action and research process. This reflecting helps the researcher to identify other problem areas and to design new cycle of action research. Moreover, Kurt Lewin, the father of action research, documented that group-decision-making is a matter of 'principle' rather than a matter of technique in the process of action research. He emphasized the value of involving participants in every phase of action research (Planning, Acting, Observing and Reflecting) because of which this is a participatory form of research.

Qualitative Vs Quantitative

Qualitative researchers claim that genuinely and distinctively human dimension of education cannot be captured by statistical generalization as is done in quantitative researches. Knowledge of human affairs is subjective. It must grasp the meaning of action, the uniqueness of events, and the individuality of person. Event is lawful even if it occurs only once in an individual. The development of a law depends upon the purity of a case and not necessarily upon the frequency with which it occurs. So Lewin (1946) put the argument that laws need not be formulated solely on the basis of statistical average, rather the individual

case is equally important. So he stated that $B = F(PE)$, where B represents behaviour; f is a function; p, the person; and E, the total environmental situation. From this perspective, it is easy to see the quantitative tradition as an unwanted, even alien and antihuman approach to the study of education. There is the necessity of qualitative analysis of action or practice and the determinants of practice to develop a theory or law replacing the quantitative notions of validity, reliability and objectivity. Validity is not a matter of establishing a correspondence between the theory and the world, when the goal is social improvement. Rather what counts as valid inquiry is limited to what the surrounding epistemology counts as promoting human behaviour.

It is assumed that if policy-makers and practitioners are directly engaged in the research enterprise, they will not only facilitate the utilisation of research findings but they will also promote wider diffusion and acceptance of research-based knowledge. Such approach emphasizes the unity of the components of creation, diffusion and utilisation of knowledge rather than the distinctiveness of each component. This is the underlying theory of action research.

If this is the importance of action research in the development of professionalism, one thing obvious that comes to mind is that why such research is not so widely carried out.

After Kurt Lewin's approach on action research in about 1944, it enjoyed a decade of growth and started to decline in the 1950s. The decline is attributable to a growing separation of action and research (practice and theory). Academic researchers in social sciences generally enjoy unpreceded support from public. They distinguish between work and status. Perhaps one of the important causes of its declination is the characteristic of local applicability of the findings of action research as against universal acceptability. However, now-a-days, teachers are taking the contribution of action research seriously. The accountability movement has galvanized and politicized the teachers. In response to the accountability movement, teachers have adopted the self-monitoring role as a proper means of justifying their practice and generating sensitive critiques of the working conditions in which their practice is conducted. There is increased awareness of action research itself, which is perceived as providing an understandable and workable approach for the improvement of practice through critical self-reflection because of which teacher as action researcher has gained more acceptance in recent years.

Uses of Action Research

Action research is concerned with contributing to

the development of case or cases under study by feedback of information which can guide revision and refinement of the action. In the curriculum development and reformation projects, action research is extensively used to produce curricular specifications and materials. When teaching strategies are important in development, teachers are highly involved in developing their own teaching through self-case study. Teacher as action researcher will embark on a course of action strategically; monitor the action, the circumstances under which it occurs, and its consequences; and then retrospectively construct an interpretation of the action in context as a basis for future action. Knowledge achieved in this way informs and refines both specific planning in relation to teaching and the teacher's instructional theory. The interpretation of other participants in the situation will be relevant in the process of reconstruction. The crucial point, however, is that only the teacher can have access to the perspectives and commitments that inform teaching profession. Thus teaching profession can only be researched by the teacher himself.

The context of practice is always changing and requires continuous innovations. It is only through retrospective reflection that the participants develop their understanding of the ends-in-view. For the improvement of teaching in higher education, developing learning to learn skills among the students, developing research skills among them, improving the quality of learners' response, developing innovative methods of teaching and determinants of teaching profession which as a whole constitute the professional environment of the teacher, action research can be conducted. Grundy and Kemmis (1981) have argued that action research must focus on the structural determinants of practice as well as on those elements which teachers can change. Educational action research is not only practical but emancipatory where the teachers have many a role to play. However, the findings of action research are to be evaluated in terms of local applicability and not in terms of universal validity. Teacher as a researcher can develop his professional standards and improve the determinants of his professional environment by action research to contribute more to the educational development of society in general and students in particular.

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CAMPUS NEWS

South Zone VCs Meet

The two-day South Zone vice chancellors conference held recently at Thiruvananthapuram called for restructuring the education system within a short span of time to make it competitive to meet the present day social needs. Inaugurating the conference in which 40 vice-chancellors from the southern parts of the country and two from Sri Lanka participated, Kerala Education Minister P J Joseph said that the existing education system was designed for an entirely different pattern with different social needs of a primitive and agrarian feudal society and could not fully serve the needs of the contemporary world.

The conference in a resolution stressed the need for an evaluation of new teaching-learning material, teacher training programmes, evaluation processes, attitudinal changes in teachers and students and administrative procedures for facilitating continuous revision. However, a holistic approach to syllabi restructuring was warranted. Specifically, the syllabi should reflect the advances in the global scientific-technical knowledge base and the immense possibilities of using information and technology in education and research. The educational methodology should shift from a teacher-centered to a student-centered process. Emphasis should be on practical and applied training rather than on classroom lectures. The curriculum should be restructured taking into account the needs of the end users who could also be involved in the process.

On granting autonomy to colleges as a solution to many prob-

lems facing higher education, the resolution said that given the experiences of the colleges which had opted for autonomy the Prospect was not promising. The proposal for the constitution of private universities as a means of augmenting resources and for bypassing administrative bottlenecks needed re-examination. The augmentation of financial resources from non-government sources was inevitable and essential if the universities were to face the challenges of the next millennium. Problems faced by different types of universities needed to be addressed in the specific situation.

Institutions offering professional education could tap different sources such as corporate sector endowments and consultancy services. Apart from new resource mobilisation, more judicious use of existing resources including inter-university sharing of the existing infrastructure and equipment should be encouraged.

RCEAM Annual Conference

The Rajasthan Council of Educational Administration and Management (RCEAM) in collaboration with Asian Institute of Human Rights Education recently organised a four-day Conference on "UN Decade for Human Rights Education (1995-2004) — Retrospect and Prospect at CASA, Udaipur. One hundred educationists from all over the country participated in the conference. There were six different sessions and two plenary sessions. About fifty papers were presented by the learned experts and participants. The Con-

ference was inaugurated by Prof. Gulab Chaurasia, Patron, RCEAM President CTE and WCCI. Key-note address was delivered by Former Chief Justice of Karnataka, Justice Madam Kanta Bhatnagar. The function was presided over by Mrs. Shanta Trivedi, Sansthapika Adhyaksha Rajasthan Mahila Parishad.

On this occasion a brain storming session on Human Rights Education was held. A Quiz on Human Rights Education was also organised.

At the conference the following declaration was made.

1. This Conference adopts Vienna Declaration and Programme of Action, 1993 and the Delegates resolve that they will promote action for implementing the recommendations.
2. Resolve that Colleges of Education and District Institutes of Education and Training should organise training courses to prepare resource persons for Human Rights Education. Universities and State Governments should provide facilities and resources for this purpose.
3. Schools and Colleges should open centres for Human Rights Education to promote awareness in their region.
4. National Commission on Human Rights and State Commission on Human Rights should encourage and support NGOs working in the field of Human Rights Education.
5. At the state level, the State Council of Educational Re-

search and Training (SCERT) should have a Department of Human Rights Education for guiding the centres in the state. The SCERT Centre should promote training courses for resource persons and help in the production of instructional material and teaching aids.

6. The UN has declared the U.N. Decade for Human Rights Education (1995-2004). The Vision of the UN is that the entire human race should become literate in human rights. Therefore, the conference recommends that seminars/meetings etc be held in every Development Block of Every District in India.
7. The Universal Declaration of Human Rights (Dec. 10, 1948) should be translated in all regional languages and it should be sent to all schools, colleges, universities and Gram Panchayats in every Distt.
8. The Assam Institute of Human Rights Education should nominate State Chairperson in every State and District Projects Directors in every District.
9. The AIHRE shall explore other NGOs in the country, their programme and activities in the field of Human Rights Education.
10. On this World Teachers day we greet all 50 million teachers of the world, who are shaping the new generation of learners with devotion in spite of several problems and shortcomings.
11. We greet Education International (E I), the biggest Champion of Teachers representing 23 million teachers in 121 countries and convey ap-

preciation to E.I. Colleagues in Brussels, Belgium for their Commitment to Professional Organisation of Teachers all over the world. We assure full support to all E.I. Programmes in India.

Computer Application in Social Sciences

The Centre for Social Studies, Surat, proposes to organise a training course in Computer Applications in Social Sciences on 2-11 February, 1999. The course is meant for those who are engaged in survey research and have to deal with data processing and analysis. It is aimed at exposing the participants to computer processing, fundamentals of computer, basic requirements of proper processing of data and to give a general idea about the organisation and quantification of data and statistical methods. Knowledge of basic statistical methods is essential.

The course contents include (1) Introduction to Computer, its structure and input-output devices, general guidelines on hardware and software selection, various input/output mediums; (2) Transfer of coded data to input mediums, data retrieval and data validation; (3) Making use of computer analysis; (4) Statistical techniques; and (5) Use of SPSS (Statistical Package for the Social Sciences).

Further details may be obtained from Mr. D.C. Sah, Course Director, Centre for Social Studies, South Gujarat University Campus, Udhna Magadalla Road, Surat-395 007.

Home Science Programme Vocationalized

The G.B. Pant University of Agriculture & Technology has revised and vocationalized its U.G. Home Science Curriculum. This

new, job oriented/professional programme, has come into effect from the current academic year. In-plant training and rural work experience in related industries/institutions/non-government organizations/Krishi Vigyan Kendras will provide more practical training/exposure to the students. The total duration of the B.Sc. Programme is now four years.

Courses related to Textile Science, Garment Manufacture, Applied Arts, Nutrition Counselling, Food Enterprise Management, Child Care Centre Management, Play Material Designing etc form the vocational component. Packages of vocational elective courses from the four major areas of Home Science have been formulated so that a student can specialize in any one area of his/her interest and seek job accordingly.

Women in Higher Education

The Association of Indian Universities and the Alagappa University, will jointly organise a Seminar on Women Participation in Higher Education on November 26-27, 1998 at Karaikudi. The seminar will focus on the status of women in higher education and their participation in teaching, research, extension activities and administration—especially at the higher level.

The sub-themes of the seminar are (i) Status of Women in Indian Higher Education; (ii) Women as Teachers and Researchers; (iii) Women in Co-curricular and Extra-curricular activities, (iv) Women in Administration; and (v) Specialised Higher Education Institutions for Women.

Further details may be obtained from Dr. Regina Papa, Director, Women Studies, Alagappa University, Alagappa Nagar,

Karaikudi-630 003 OR Ms. Zeenat Shafi, Association of Indian Universities, AIU House, 16 Kotla Marg, New Delhi-110 002.

CAD Laboratory at IIT Delhi

The Mechanical Engineering Department of the Indian Institute of Technology (IIT), Delhi, is reported to have set up a state-of-the-art 'lab and classroom' for instruction in Computer Aided Design (CAD) and graphics.

The CAD facility was inaugurated by the IIT Director, Professor V.S. Raju. The inauguration was followed by a technology appreciation seminar on CAD, organised by the Foundation for Innovation and Technology Transfer, and attended by participants from industry.

The classroom is meant for teaching graphic science, engineering, drawing and CAD. Conventional drafting desks have been replaced by the state-of-the-art computerised design workbenches equipped with the latest modelling as well as analysis and visualisation tools including Helix Design System. The classroom is equipped with 85 networked pentium computers and two servers.

TIET Convocation

The Human Resource Development and Science and Technology Minister, Dr. Murli Manohar Joshi, said the government had realised the future of the country lay in mastering information technology and that it had the potential to emerge as a global information technology power. He was delivering the convocation address at the Thapar Institute of Engineering and Technology (TIET) in Patiala recently. He suggested a three-

pronged initiative : Accelerating the setting up of information technology infrastructure; creation of a policy ambience to increase software exports to \$50 billion by 2008; and extensive use of information technology by all sections of society.

Dr. Joshi said to achieve this thrust an "operation knowledge" had been suggested under which computers with Internet facility would be installed in all schools, universities and public hospitals. He said besides this it was envisaged to network all centres of higher education to spread distance education and make information technology compulsory in all degree courses.

The Union Minister said the country had to become proficient in the use of information technology as it had become imperative for the country to do so keeping in view various restrictions imposed on it. He said, however, the country had risen to the challenge and had developed technology for weather prediction called flosolver as an alternative to the cray computer besides the param-10000 super computer which could perform 100,000 million mathematical operations per second.

Dr. Joshi also advocated the networking of institutions for resource sharing. He said under this, technical education could be offered through distance mode of learning and institutional expertise could be utilised through non formal and continuing education programmes for sector professionals. He, however, expressed concern at the quality of research in universities saying that in 1981 Indian research publications were 2.44 per cent of world research publications which had gradually

diminished and come down to 1.77 per cent in 1991 and was only 0.1 per cent in 1995-96.

Dr. Joshi said though many engineering institutes relied fully on the financial support available from central and state governments it would be unlikely that future governments would be able to meet the enormous funds necessary for engineering institutes. He said there was a broad consensus that all stakeholders of higher technical institutes must contribute towards the finances for running them. He said the quantum of resources generated internally must reach 50 per cent of the recurring expenditure in a short period.

The Union Minister lauded the role of the institute's Centre for Industrial Liaison Placement and Entrepreneurial Development (CILPED) in organising vocational courses in tractor repair, motor and pump repair, carpentry, plumbing, refrigeration, welding and airconditioning.

AMU Honours Mauritius PM

The key to empowerment was education and it was by breaking from the "shackles of ignorance" that one was able to think like a free spirit, said Dr. Navinchandra Ramgoolam, Prime Minister of Mauritius, after being conferred the Doctorate of Literature at Aligarh Muslim University at the special convocation which coincided with the Founder's Day celebrated as Sir Syed Day.

"I wonder where I would be, had he not run to school", the Prime Minister said referring to his father, the first Mauritius Prime Minister, Mr. Seewoosagur Ramgoolam. Son of an indentured labourer, his father had run away

to school and was able to lead his people to independence on the bulwark of education.

The Mauritius Prime Minister was conferred the doctorate for his "invaluable and rare combination" for higher education, removal of illiteracy, fostering economic growth and social reconstruction.

Dr. Ramgoolam appreciated the contribution of scholars from AMU who had made his country richer in diversity by propagating Muslim culture and Urdu language. Mauritius, he asserted, aimed at an intellectually unfettered and dynamic society by carefully nurturing its different people.

The collaboration between AMU and Mauritius would be deepened, he assured the gathering. Emphasising the importance he associated with his visit to the university, he said: "This is a day I will not forget for as long as I live."

Addressing the commemoration meeting, the Vice-Chancellor, Mr. Mahmoodur Rahman, admitted that the university had been disturbed in the recent past. He cautioned the gathering to be careful not to let the university's reputation suffer at every step and sought their cooperation to make the university move ahead. The objects had been reached on the path of Sir Syed's thinking and if this was not practised, discordance would not be removed. He extolled Sir Syed's historical perspective to free the Muslims from ignorance.

Workshop for Asian Documentalists

Dr. Roshan Raina, Librarian, Indian Institute of Management, Lucknow, conducted a workshop on "Innovations in Managing & Marketing Library and Information Resources", for

Asian Documentalists/Librarians, during Sept. 09-11, 1998, in Singapore. 28 participants from 12 Asian countries participated in the workshop. The workshop was organised by the Asian Media Information and Communication Centre, Singapore with support from the Japan Foundation Asia Centre and UNESCO.

Workshop on Training Effectiveness

The Institute of Applied Manpower Research proposes to organise a workshop on Training Effectiveness, in New Delhi on November 26-27, 1998.

The objectives of the workshop are i) to deliberate upon the role of training behind the success of the organisation; ii) to examine the strategies that help the organisation to develop human resources for future needs both qualitatively and quantitatively; iii) to sensitise about training as a tested tool for enhancing consumers satisfaction; iv) to deliberate upon the issues relating to benefits to the organisation, the superiors, the trainees. The benefits have to be weighed in terms of cost and the short and long range benefits. It has to be deliberated whether the organisation has developed enabling capabilities to cope with the emerging changes in the organisation; v) to provide perception of new training approaches for enhancing effectiveness of training programmes.

The issues to be discussed include i) Determinants of Effectiveness — Employers' Perception, Trainers' Perception, Employers' Satisfaction, Employees' Satisfaction, Trainers' Satisfaction; ii) Cost-Effectiveness — Direct Cost, Indirect Cost vis-a-vis Benefits; iii) Techniques of Evaluating Effectiveness — Critical Programme Evaluation, Follow-up Questionnaire Method, Survey Method, Benefit Cost Analysis, Actual Record; and iv) Suggested strategies for enhancing training effectiveness.

Further details may be obtained from Dr. J.P. Saxena, Head (Training), Institute of Applied Manpower Research, Indraprastha Estate (Opp. Indira Gandhi Indoor Stadium), Mahatma Gandhi Marg, Ring Road, New Delhi-110002.

We Congratulate...

1. Dr. V.K. Patil who has taken over as Vice-Chancellor of the Indira Gandhi Krishi Vishwavidyalaya, Raipur.

2. Dr. Aditya Prasad Padhy who has taken over as Vice-Chancellor of the Berhampur University, Berhampur.

3. Prof. Y. Venkatarami Reddy who has been appointed Vice-Chancellor of the Jawaharlal Nehru Technological University, Hyderabad.

APOLOGY

We deeply regret that the paper "The Concept of Accountability and Academic Accountability : An Overview" by R.P. Shukla, Reader, Deptt. of Education, Nagaland University, Kohima published in the University News of June 29, 1998 was plagiarised principally from the papers by K B Powar, A Gnanam and to a lesser degree from the papers by R R Raghavulu, G V Patil and S K Verma that appear in the AIU publication "Accountability in Higher Education" (1995).

News from Agricultural Universities

Weed Management Project

State Agricultural Universities of Punjab and Haryana would unitedly work to fight the menace of dreaded *Phalaris minor* weed in wheat in collaboration with the Australian farm scientists. This was disclosed by Prof. J.B. Chowdhury, Vice-Chancellor of Haryana Agricultural University in Hisar recently. He said that the Australian Centre for International Agricultural Research had sanctioned a Rs. 60 lakh project to fight the menace. He said besides Punjab and Haryana, the weed had become a serious problem in all those states where rice-wheat cropping system had been practised over the years. Also known as Kanki, Mandusi and Guli-danda, the weed had been reported to cause heavy losses to wheat production.

He said earlier isoproturon, which was a herbicide of choice had now proved ineffective with the development of resistance in the weed against this herbicide. As a result the weed problem had flared up, he said.

Prof. Chowdhury said considerable researches were required to develop alternative weed management practices that could either prevent or delay herbicide resistance. According to him the new project launched with the assistance of the Australian agency would help in tackling this problem in wheat.

Meanwhile, a technical programme to curb the *Phalaris* menace had been worked out at

a meeting of Dr. Gurjeet Gill, the Project Coordinator from Australia, Dr. R.K. Malik and Dr. L.S. Brar, Project Leaders at Haryana Agricultural University and Punjab Agricultural University respectively. Dr. Gill said that the *Phalaris* problem also existed in some pockets of Australia. However, the Australian scientists had been successful in devising technology to control this weed adding that the technology would be shared among these universities.

The Project leader at HAU, Dr. R.K. Malik said that efforts would be made to sustain productivity of wheat in the rice-wheat cropping system. He revealed that three scientists each from both the collaborating universities would visit Mexico and two each would go to Australia during the three-year tenure of the project.

Veterinarians Meet

A national seminar on the "Role of Veterinarians in National Economy in 21st Century", organised recently by the Indian Veterinary Association in New Delhi has

recommended that standards for veterinary polyclinic hospitals and dispensaries should be developed in terms of man and material power including annual financial budget.

Speakers also stressed that there was a need to have Indian veterinary pharmacopia. "A canine research centre should be established to contain communicable diseases and also to develop dog as a friendly companion of human being," they stated.

One of the major recommendations was that alternative systems of medicine such as homoeopathy/unani/ayurvedic should be considered for developing a holistic system of medicine.

"Modernisation of abattoirs should be taken as a national programme," the seminar recommended.

Other recommendations which emerged at the seminar included establishment of "Central Veterinary Services", establishment of a veterinary college in Delhi, establishment of Central Livestock Extension Institute and goat/sheep rearing be taken up in high altitude hill areas in organised farming system.

News from UGC

Countrywide Classroom Programme

Between 15th and 21st November, 1998 the following schedule of telecast on higher education through INSAT-1D under the auspices of the University Grants Commission will be observed. The programmes are telecast on the Doordarshan's National Network

from 7.15 to 8.00 a.m. every day except on Saturdays & Sundays. These programmes are also telecast on Doordarshan's National Network from 6.00 to 7.00 a.m. two days a week i.e. on Saturdays and Sundays. On DD2 International Programme will be shown

at 11.00 to 12.00 hours on Saturdays only.

Hindi Programmes are being telecast on Mondays to Fridays from 6.00 to 6.30 a.m.

15.11.98

"Communication Among Honey Bees"
"Harnessing Biodiversity"
"Searching the Frontiers-1
Electroceramics"

16.11.98

"The Singularity of Dr. Amal Roy Chowdhuri"
"The Butterfly Effect"

17.11.98

"Earthquake"
"Save the Elephant"

18.11.98

"Endoskeleton in Arthropods"
"The Insect Eater"
"Enroute to Fabric Queen"

19.11.98

"Question Time-88"
"The Enchanted Looms : Perceptions of the Mind"
"Silk Weaving"

20.11.98

"Poetry of the First World War"
"Bookfare-5 : Bestsellers"

21.11.98

"Indian Women : From Rhetoric to Reality — Women & Law-5"
"Speak the Speech-2"
"Anar (Pomegranate)"
"International Programmes"

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16.11.98

"पोलेरोग्राफी के मूल रूप"

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"जल गुणवत्ता प्रबंधन — जल का सूक्ष्म जीविय परीक्षण"

18.11.98

"विद्युत चालकता मूलक अनुभापन"

"सीताफल"

19.11.98

"सक्रीयता बहुलक भाग-1"

"प्रगति के बादल : ग्रामीण विकास का

"नया पहलू"

20.11.98

"सक्रीयता बहुलक भाग-2"

"खामोश गतिविधि"

News from Abroad

TWAS Awards in Basic Sciences 1999

The TWAS Awards in Basic Sciences were instituted in 1985 to recognize and support outstanding achievements made by scientists from developing countries. The Awards are the highest recognition accorded by the Academy for excellence in scientific research in the Third World. They are awarded to those individual scientists in developing countries whose research work has made significant contributions to the advancement of sciences.

The nomination should be accompanied by a 1-2 page biographical sketch of the nominee including his/her major scientific accomplishments, a list of 12 of the candidate's most significant publications as well as a complete list of publications and biodata. Nominations for the awards are invited from all Members of the Third World Academy of Sciences as well as from science academies, national research councils, universities and scientific institutions in developing and advanced countries.

Five Awards in Basic Sciences are given each year in the fields of Basic Medical Sciences, Biology, Chemistry, Mathematics and Physics. Each award consists of a prize amounting to US\$10,000 as well as a plaque on which major contributions of the award winner are mentioned. The Awards are usually presented on a special occasion, normally coinciding with the General Meeting of the Academy and/or a General Conference organized by the Academy.

Candidates for the awards must be nationals of developing countries and, as a general rule, working and living in those countries. Members of the Third World Academy of Sciences are not eligible.

Nominations are made on the relevant TWAS nomination forms and should clearly state the contributions which the candidate has made towards the development of the particular field of science for which the award would be given.

The Awards are highly competitive and the selection of the awardees is made solely on scientific merit. Only those candidates who meet the awards' standard of having made outstanding scientific discoveries will be selected for the awards. A committee of TWAS members has been appointed by the TWAS Council for each of the five awards, and is charged with selecting the awardees.

Nominations for awards should reach the Third World Academy of Sciences no later than 1 March of each year. Nominations received after this deadline will be considered of the following year.

Inquiries and completed nomination forms should be addressed to : Ms. Helen Grant, TWAS Awards in Basic Sciences, Third World Academy of Sciences, P.O. Box 586, I-34100 Trieste, Italy, Phone : (+39 40) 2240-387, Fax : (+39 40) 224559, E-mail : twas@ictp.trieste.it

An Earnest Endeavour for Posterity

K. Arumugam*

Suresh Kumar Lau. *Great Indian Players*. Delhi, Sports Publication, 1998. Pp. 326. Rs. 250/-.

Sports literature, like medals in the international fora, are rare in India. Other than cricket, one hardly comes across any worthwhile common interest writings in all genres like statistics, biographies, compilation of essays etc. This dismality existed despite the positive indicators such as more and more youngsters taking sports and games as way of life, enhanced importance in print and visual media and ever-increasing government, corporate and public spending on sports promotion. The scenario is chroniclers' anathema and discerning readers' dilemma. Perhaps, it *inter alia* contributed to the uneven growth of sports in India. On the other side, our sports achievements being what they are, it hardly created an environ for genuine writers to pool up their potential in this respect. This had serious fallout. Many achievements of players—present and past—other than popular disciplines went unrecognised, publicity denied and the golden moments lost in the tide of time.

In his backdrop, it is refreshing to come across a mind boggling compilation of 547 sports persons in 33 disciplines right from glorious wrestler Gama born in 1880 down to the likes of Leander Paes, in the 326 pages '*Great Indian Players*' penned by

Suresh Kumar Lau. Those who involved in sports activities and reporting would agree on the significance and indispensability of such a volume. Given the track record of maintaining no record, negligence and collective amnesia, Lau's effort is commendable. Starting from a scratch, he has evolved the edifice to an intellectually satisfying level. The compendium which also has 420 stamp size pictures—quite a few of them are rare one such as those of coach Karan Singh, wrestler Khashaba Jadhav—gives a panoramic view of life and achievements of every leading sportsperson the colonial as well as Independent India produced.

The task is stupendous. He spreads a vast canvas to paint on. Thanks to the Himalayan effort of the author, we encounter six generations of sports personalities in a single volume—from Richard John Allen (1902) to Dhanraj Pillay in hockey, C.K. Naidu (1885) to Sachin Tendulkar in cricket, Karni Singh (1924) to Jaspal Rana in shooting, Mihir Sen (1930) to Kutraleeswaran in swimming, Nirajit Singh (1940) to Saly Joseph in volleyball and Ghause Md. Khan (1915) to Mahesh Bhupathy in tennis.

Expectedly, traditional fields of athletics, hockey, cricket and wrestling take much of the cake in the book with 112, 66, 45 & 32 life sketches, respectively. Even new

areas such as ball badminton, powerlifting, skating and carrom have found a place albeit in a small way. What makes the book a compulsive reading is not just this totality in terms of coverage but the meticulous eye for details cast in a lucid manner. We come to know, for example, how 14 years old K.D. Singh 'Babu' outsmarted an Olympian in a domestic match, the ordeal of Gama who died unsung in Pakistan, the exploits of famed gymnast Shyamal Khullar and winner of the wrold cup polo Hanut Singh coaching to Lord Mountbatten. Many such write-ups enliven the readers and steer clear of monotony.

While selecting the persons for inclusion—a gigantic task indeed—the author had, in a three tier approach, applied Arjuna award as one of the criteria. With vast data and vision at his command, he need not have resorted to the increasingly disputable award instead of his own judgement. But for this, mandatory incomplete and inaccurate profiles of two or three lines in an otherwise exhaustive mode could have been averted. That is why perhaps we miss out a few contemporary greats such as Poornima Mahato the adivasi archer, footballer of fame L.M. Vijayan and internationally acclaimed golfer Chiranjeev Milkha Singh, to quote a few. Volleyball seems to be the worst sufferer of this approach.

This book may not attract rave reviews, but posterity will salute the efforts of collating such a vast data and presenting in a pleasing format. The volume should serve as reference material for those involved in the realm of sports, education and historical research.

*Sports Journalist, 59F Sector IV,
Pushpa Vihar, New Delhi-110017.

THESES OF THE MONTH

A list of doctoral theses accepted by Indian Universities

HUMANITIES

Fine Arts

Performing Arts

1. Pradeep Kumar. *Tanasha folk theatre of Maharashtra.* (Prof B N Saha), Department of Theatre Arts, University of Hyderabad, Hyderabad.

Geography

1. Chandrashekara, B. *Patterns of rural settlements in southern maldan region of Karnataka State.* (Dr Krishna Murthy), Department of Geography, University of Mysore, Mysore.

2. Lakshmana, C M. *Population change and socio-economic development of Tumkur District.* (Dr B Erwarappa), Department of Geography, Bangalore University, Bangalore.

History

1 Ramachandra Murthy, R Sri. *The development of iconography in select temples in Northern Andhra.* (Dr B Masthamaiyah), Department of History and Archaeology, Andhra University, Waltair

Language & Literature

English

1 Alexander, Cherian. *Writers from the other Europe : Major voices and themes in contemporary Eastern European literature in translation.* (Prof Vimala Ramarao), Department of English, Bangalore University, Bangalore

2 Bhelkar, Ratnakar Deoraoji. *A study of fantasy and reality in the major British Science fiction from 1890 to 1970.* (Dr J B Paranjpe), Department of English, Nagpur University, Nagpur.

3. Das, Mrinal Kanti. *A critical study of George Bernard Shaw as a novelist.* (Dr R N Roy), Department of English, Nagpur University, Nagpur

4 Joseph, Sunny. *Aristotelian poetic concepts and William Wordsworth.* (Dr R K Bajpai), Department of English, Devi Ahilya Vishwavidyalaya, Indore.

5 Kahru, Arupa. *Women in the novels of Pralit Bock : A study of her ten selected novels.* (Prof Hirendra Nath Datta), Department of English, Gauhati University, Guwahati.

6 Sahoo, Prasanta Kumar. *The text books and allied teaching materials in general English paper at the plus two, +2 and three year degree course, TDC stages in Assam : An evaluation.* Department of English, Utkal University, Bhubaneswar.

7 Saluja, Vineeta. *A critical study of Sylvia Plath's poetry.* (Dr S S Shrivastava), Department of English, Rani Durgavati Vishwavidyalaya, Jabalpur.

8 Sepaha, Preeti. *Depersonalised sensibility in Eliot's aesthetic criticism.* (Dr R C Ojha), Department of English, Devi Ahilya Vishwavidyalaya, Indore.

9. Srinivasan, Pannala. *Themes and techniques of modern Indian women poets in English.* (Dr R K Bajpai), Department of Eng-

lish, Devi Ahilya Vishwavidyalaya, Indore

10. Vidhya Rao, Vardhini. *Major themes in the novels of Ernest Hemingway.* (Dr R K Bajpai), Department of English, Devi Ahilya Vishwavidyalaya, Indore

Hindi

1 Ingale, Devidas Yeshwant. *Swatantryottar Hindi natak mein patra pradhanata kee vishishtata, pachas vishesh natakon ke sundarbh mein.* (Dr D K Gaikwad), Department of Hindi, Shivaji University, Kolhapur

2. Kadam, Ranu Dharma. *Swatantryottar Hindi natak ke shirshakon kee sarthakata.* (Dr D K Gaikwad), Department of Hindi, Shivaji University, Kolhapur

3. Kharatmal, Vinayak Yashwant. *Amrit Ras ke amnagra sahitya ka sameekshatmak adhyayan.* (Dr A G Chavan), Department of Hindi, Shivaji University, Kolhapur.

4. Patil, Shailaja Shivajirao. *Kamleshwar ke upanyas mein chitrit samaj jeevan ka annheekshan.* (Dr A G Chavan), Department of Hindi, Shivaji University, Kolhapur

5. Sadashiviah, H G. *A comparative study of Sita in Hindi and Kannada Ramakavyas with special reference to Tulsi and Pampa.* (Dr Nirmala Prabhu), Department of Hindi, Bangalore University, Bangalore.

6. Sakunkhe, Anil Maruti. *Himanshu Joshi ke katha sahitya mein samaj jeewan.* (Dr P S Patil), Department of Hindi, Shivaji University, Kolhapur.

7. Sharma Karmath, Ram Knpal. *An evaluation of the bilingual English Hindi translation of administrative materials with particular reference to railway and other surface transport.* (Dr G Gopinathan), Department of Hindi, University of Calicut, Calicut.

8. Singh, Sarojini Jaiprakash. *Hindi natya lekhikayen aur unka krititva.* Department of Hindi, The Maharaja Sayajirao University of Baroda, Vadodara, Kannada

1 Choudhari, Vithal Ramagood. *Solapur Veerashaiva parampara ondu adhyayan.* (Dr S V Ayyanagoudar), Department of Kannada, Karnatak University, Dharwad.

2 Maheshwari, U. *The early novels in Kannada : A feminist study.* (Dr P Srikrishna Bhat), Department of Kannada, University of Calicut, Calicut.

3 Sathyaprema, K. *The story of Nala-Damayanthi in Kannada literature.* (Dr P Srikrishna Bhat), Department of Kannada, University of Calicut, Calicut.

Malayalam

1. Kumaran, U V. *Puregamana sahitya prasthanavum P Kesavadevum.* (Dr K K Karunakaran), Department of Malayalam, University of Calicut, Calicut.

Marathi

1. Deshpande, Deepa Vivek. *Mahanubhaviya sifat kavya rachanasha abhyam.* (Dr K B Kundap), Department of Marathi, Shivaji University, Kolhapur.

2. Kulkarni, Pratibha Shamkant. *Autobiographies of actors in*

Marathi. (Dr Shivajirao R Chavas), Department of Marathi, Shivaji University, Kolhapur.

Oriya

1 Debata, Saroj Kumar **Lokageetare rasacharya.** (Dr K R Panigrahi), Department of Oriya, Sambalpur University, Jyoti Vihar, Burla.

Punjabi

1. Kulwant Singh. **Satven dahak de Panjabi natak da pravirti moolak adhyayan.** (Dr Manjit Singh), Department of Punjabi, Panjab University, Chandigarh.

Sanskrit

1. Bakshi, Anjali. **Bhaas ke natyakon mein nari.** (Dr D R Sharma and Dr Vasundhara Rehani), Department of Sanskrit, Panjab University, Chandigarh.

2. Bhatta, Manjunath. **Rasa theory in Sanskrit plays based on Mahabharata.** (Dr Suguna Murthy), Department of Sanskrit, Bangalore University, Bangalore.

3. Dattatreya Sastr, M. **Saktiveda vimsatih.** (Prof P Sreerama Murty), Department of Sanskrit, Andhra University, Waltair.

4. Sarma, Nripendra Nath. **Ashvaghoshas Buddhacarita; A study.** (Dr Ashok Kr Goswami), Department of Sanskrit, Gauhati University, Guwahati.

5 Sathian, M. **Contribution of Kalkulamara Ramavariyar to**

Sanskrit studies. (Dr P Narayana Namboodiri), Department of Sanskrit, University of Calicut, Calicut.

6. Shukla, Vibhu. **Atharvaveda kee saktiyen ka adhyayan.** (Dr M L Purohit), Department of Sanskrit, Rani Durgavati Vishwavidyalaya, Jabalpur.

7 Subrahmanian, K. **Contribution of Manavikrama Kaviraja to Sanskrit literature.** (Dr C M Neelakandhan), Department of Sanskrit, University of Calicut, Calicut.

Telugu

1. Satyavati, S Nadendla Gopanam - Srikrishnarjuna samavadam : Oka pariteeksha. (Dr K S Indira Devi), Department of Telugu, Sri Padmavati Mahila Visvavidyalayam, Tirupati

Urdu

1 Khan, Shakeel Ahmed. **Azadi ke bad Urdu Hindi shanron ka taqabull mutala.** (Prof S R Kidwai), Centre of Indian Languages, Jawaharlal Nehru University, New Delhi.

Philosophy

1 Dhanju, Poonam **Structure of value experience : A critical study of Nicolai Hartmann and Max Scheler.** (Dr V T Sebastian), Department of Philosophy, Panjab University, Chandigarh.

2 Tiwari, Rachana **Humanism in the Philosophy of Rabindranath Tagore.** (Dr Gayatri Sinha), Department of Philosophy, Rani Durgavati Vishwavidyalaya, Jabalpur

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Qualifications Essential : i) Doctoral degree in Plant Pathology/Entomology/Nematology or any other branch of plant protection. ii) At least 5 years experience as a Principal Scientist (Rs. 4500-7300) or in an equivalent position. OR An eminent Scientist having proven record of scientific contribution working in a reputed organisation/institute having atleast 18 years experience in the relevant subject. iii) Evidence of contribution to Research/Teaching/Extension Education as supported by published work/innovations. iv) Specialisation and experience in plant protection.

Desirable : Experience in a Research Management Position.

178. Project Director, Directorate of Oilseeds Research, Hyderabad. (One Post)

Qualifications Essential : i) Doctoral degree in Plant Sciences. ii) & iii) As in Item No. 177(ii) & (iii) above. iv) Specialisation in Oilseeds Research and Development. **Desirable :** Experience in a Research Management Position.

HEAD OF DIVISIONS

Pay Scale : Rs. 4500-7300 (Pre-revised)

National Institute of Research on Jute & Allied Fibre Technology, Calcutta.

179. Head, Division of Transfer of Technology. (One Post)

Qualifications Essential : i) Doctoral degree in applied Physics or Textile/Agril. Engg/Chemical Technology. ii) Principal Scientist in the scale of Rs. 4500-7300 or in an equivalent position OR 8 years experience as a Senior Scientist (Rs. 3700-5700) or in an equivalent position OR An eminent Scientist having proven record of scientific contribution working in a reputed organisation/institute having atleast 13 years experience in the relevant subject. iii) As in item No. 177(iii) above iv) Specialisation and experience in extension & exhibition activities for Transfer of Technology.

INDIAN VETERINARY RESEARCH INSTITUTE, IZATNAGAR.

180. Head, Division of Physiology & Climatology. (One Post)

Qualifications Essential : i) Doctoral degree in Animal Physiology/Vety Physiology ii) & iii) As in Item No. 179(ii) & 177(iii) above. iv) Specialisation and experience in any field of Animal Physiology/Climatology/Reproductive Physiology

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE, COCHIN.

181. Head, Physiology Nutrition & Pathology Division (PNPD). (One Post)

Qualifications Essential : i) Doctoral degree in the relevant subject ii) & iii) As in Item No. 179(ii) & 177(iii) above iv) Specialisation and experience in fish or animal physiology or Genetics, or Nutrition or Pathology

182. Head, Socio Economic Evaluation and Technology Transfer Division (SEETTD). (One Post)

Qualifications Essential : i) Doctoral degree in Economics/Agricultural Economics/Agricultural Extension/Extension Education ii) & iii) As in Item No. 179(ii) & 177(iii) above iv) Specialisation in fisheries, economics, extension, Transfer of Technologies and extension education in marine fisheries sector. Relevant experience in planning, guiding and implementing research programmes in fisheries economics and extension

NATIONAL DAIRY RESEARCH INSTITUTE, KARNAL.

183. Head, Division of Animal Biochemistry. (One Post)

Qualifications Essential : i) Doctoral degree in Animal Biochemistry/Biochemistry ii) & iii) As in Item No. 179(ii) & 177(iii) above. iv)

Specialisation and experience in research and research coordination and management in the field of Biochemistry/Animal Biochemistry/Molecular Biology.

SENIOR SCIENTIST

Pay Scale : Rs. 3700-5700 (Pre-revised). Age : Below 45 years (There will be no maximum age limit for the ICAR employees. Relaxation to SC/ST candidates may be given in accordance with the orders issued by Govt. of India from time to time).

INDIAN LAC RESEARCH INSTITUTE, RANCHI.

184. Senior Scientist (Agricultural Structures and Process Engineering). (One Post)

Qualifications Essential : i) Doctoral degree in Horticulture or other allied disciplines. ii) 5 (Five) years experience excluding the period spent in obtaining the Ph.D. degree, during service (subject to maximum of 3 years) in research/teaching/extension education as a Scientist (Rs. 2200-4000) or in an equivalent position in the relevant subject OR Master's degree in the case of Engg. disciplines with 8 years experience in Research/teaching/extension education as Scientist (Rs. 2200-4000) or in an equivalent position in the relevant Engg. subject. iii) As in Item No. 177(iii) above. iv) Specialisation and experience in the field of post-harvest technology/pilot plant studies/design of process equipments preferably in the field of resins/polymers/paints etc.

NATIONAL RESEARCH CENTRE FOR AGROFORESTRY, JHANSI

185. Senior Scientist (Horticulture). (One Post)

Qualifications Essential : i) Doctoral degree in Horticulture or other allied disciplines. ii) 5 (Five) years experience excluding the period spent in obtaining the Ph.D. degree, during service (subject to maximum 3 years) in research/teaching/extension education as Scientist (Rs. 2200-4000) or in an equivalent position in the relevant subject. iii) As in Item No. 177(iii) above iv) Specialisation and experience in Agroforestry

186. Senior Scientist (Agril. Economics). (One Post)

Qualifications Essential : i) Doctoral degree in Agricultural Economics/Economics ii) & iii) As in Item No. 185(ii) & 177(iii) above iv) Specialisation and experience in Economics analysis of Agroforestry experiments

INDIAN INSTITUTE OF HORTICULTURAL RESEARCH, BANGALORE

187. Senior Scientist (Horticulture). (Four Posts)

Qualifications Essential : i) Doctoral degree in Horticulture ii) & iii) As in Item No. 185(ii) & 177(iii) above. iv) Specialisation in Fruit Crops

ICAR RESEARCH COMPLEX FOR NEH REGION, BARAPANI

188. Senior Scientist (Soil Chem./Micro./Fertility). (One Post)
Qualifications Essential : i) Doctoral degree in Soil Chem./Micro/Fertility ii) & iii) As in Item No. 185(ii) & 177(iii) above. iv) Specialisation in the knowledge of problems of Soils in Hill areas.

189. Senior Scientist (Entomology). (Two Posts)

Qualifications Essential : i) Doctoral degree in Entomology. ii) & iii) As in Item No. 185(ii) & 177(iii) above. iv) Specialisation in working on Integrated Pest Management in different crops in hilly areas.

190. Senior Scientist (Agronomy). (Three Posts)

Qualifications Essential : i) Doctoral degree in Agronomy ii) & iii) As in Item No. 185(ii) & 177(iii) above. iv) Specialisation in water management of field crops specially in high altitude, hill terrain/topography.

191. Senior Scientist (Soil Physics). (One Post)

Qualifications Essential : i) Doctoral degree in Soil Physics. ii) &

iii) As in Item No. 185(ii) & 177(iii) above. iv) Specialisation in Watershed Management.

192. Senior Scientist (Agril Engineering). (One Post)

Qualifications Essential : i) Doctoral degree in Agril. Engineering. ii) & iii) As in Item No. 184(ii) & 177(iii) above. iv) Specialisation in Post Harvest technology of Agricultural Produce.

193. Senior Scientist (Horticulture). (One Post)

Qualifications Essential : i) Doctoral degree in Horticulture ii) & iii) As in Item No. 185(ii) & 177(iii) above. iv) Specialisation in Vegetable Crops and/or Post Harvest Preservation.

194. Senior Scientist (Agricultural Economics). (One Post)

Qualifications Essential : i) Doctoral degree in Agricultural Economics ii) & iii) As in Item No. 185(ii) & 177(iii) above. iv) Specialisation in Agricultural Marketing

195. Senior Scientist (Soil & Water Conservation Engineering). (Two Posts)

Qualifications Essential : i) Doctoral degree in Soil & Water Conservation Engineering ii) & iii) As in Item No. 184(ii) & 177(iii) above. iv) Specialisation in Watershed Hydrology.

196. Senior Scientist (Farm Machinery & Power). (One Post)

Qualifications Essential : i) Doctoral degree in Farm Machinery & Power ii) & iii) As in Item No. 184(ii) & 177(iii) above. iv) Specialisation in Farm Machinery and Power Engineering

197. Senior Scientist (Agril. Extension). (One Post)

Qualifications Essential : i) Doctoral degree in Agricultural Extension ii) & iii) As in Item No. 185(ii) & 177(iii) above. iv) Specialisation in Transfer of Technology specific to the farming systems in hills.

198. Senior Scientist (Plant Breeding). (Two Posts)

Qualifications Essential : i) Doctoral degree in Plant Breeding ii) & iii) As in Item No. 185(ii) & 177(iii) above. iv) Specialisation and experience in Rice Breeding.

PROJECT DIRECTORATE ON POULTRY, HYDERABAD

199. Senior Scientist-Poultry Science (Poultry Genetics & Breeding). (Two Posts)

Qualifications Essential : i) Doctoral degree in Genetics/Animal Genetics & Breeding/Poultry Science ii) & iii) As in Item No. 185(ii) & 177(iii) above. iv) Specialisation in Poultry Genetics and Breeding

CENTRAL RESEARCH INSTITUTE FOR DRYLAND AGRICULTURE, HYDERABAD

200. Senior Scientist (Biochemistry). (One Post)

Qualifications Essential : i) Doctoral degree in Biochemistry. ii) & iii) As in Item No. 185(ii) & 177(iii) above. iv) Relative specialisation and relevant experience cognate to the job requirement in the field of Biochemistry

IMPORTANT NOTE : 1) The candidates selected for appointment to the posts in Animal Science disciplines and possessing degree in Veterinary Science/Veterinary Science and Animal Husbandry followed by Masters and Doctoral degree in the relevant discipline will also be entitled to non-practicing allowance as admissible under the rules from time to time subject to fulfilment of conditions of entitlement for the same as prescribed by the Council. 2) The posts appearing at Sl. No. 177 to 183 will be filled up on tenurial basis for a period of five years. However, retirement age for all scientific posts is 60 years.

CLOSING DATE FOR RECEIPT OF APPLICATIONS IN AGRICULTURAL SCIENTISTS RECRUITMENT BOARD IS 15.12.1998.

(For candidates from abroad and in the Andaman and Nicobar Islands, Lakshadweep, Minicoy and Amindivi Islands, States/Union Territories in the North-Eastern Region, Ladakh division

of J&K State, Sikkim, Pangl, Sub-division of Chamba, Lahul and Spiti, districts of Himachal Pradesh, last date will be 30.12.1998)

GENERAL INSTRUCTIONS : 1. For application form, please write to the Secretary, Agricultural Scientists Recruitment Board, Krishi Anusandhan Bhawan, Pusa, New Delhi-110 012. Request for form must specify Advertisement No. and name of the post and Item No. and should be accompanied by self addressed unstamped envelope (23x10 cms size). 2 Separate application with separate fee, separate No Objection Certificate, separate Vigilance Clearance Certificate is required for each post. 3 Application form complete in all respects, should reach the Office of the ASRB together with the application fee of Rs 8/- (No fee for SC/ST candidates) in the form of crossed Indian Postal Order drawn in favour of the Secretary, Agricultural Scientists Recruitment Board by the closing date. Applications received after the closing date will not be entertained. In case a candidate anticipates delay in forwarding of his application through proper channel, he must send an advance copy of the application alongwith the fee which must reach this office on or before the closing date. Postal Order(s) obtained before the date of publication of advertisement and after the closing date of the applications will not be accepted. 4 The candidates should fill each and every column of Application Form at the appropriate place. Wherever the space is not sufficient they could add extra sheet but it should be strictly in the prescribed format. 5. Candidates abroad may apply on plain paper and send their applications together with an International Postal Order/Bank draft covering the application fee drawn in favour of the Secretary, Agricultural Scientists Recruitment Board so as to reach this office of ASRB by the closing date. In countries where regular commercial channels are not available, the candidates can deposit the application fee in local currency with the Indian Mission/Posts abroad, who in turn will issue an R.B.I. draft in favour of the Secretary, Agricultural Scientists Recruitment Board, New Delhi. 6. The prescribed Essential Qualifications are minimum and possessing of same does not entitle candidates to be called for interview. Where the number of applicants is large, the Board may restrict the number of candidates for interview to a reasonable limit on the basis of qualifications and experience higher than the minimum prescribed in the advertisement. 7. If required, candidates must appear for personal interview. 8. Higher initial pay may be recommended by the ASRB for specially qualified and experienced candidates for all the posts. 9. T.A. contribution will be admissible to those called for interview as per ICAR Rules. 10. Crucial date for determining the age limit for candidates will be the closing date for receipt of applications from candidates in India. 11. The option of use of Hindi in interviews exists in the Board. 12. Canvassing in any form will disqualify a candidate.

CORRIGENDUM

Reference ASRB Advertisement No. 4/98 which appeared in the Employment News dated 13-20.6.1998 and other Newspapers. The number of post in respect of the post of Principal Scientist (Computer Application), IASRI, New Delhi appeared at Item No. 102 may be read as :

(One post) instead of two. Other contents remain unchanged

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